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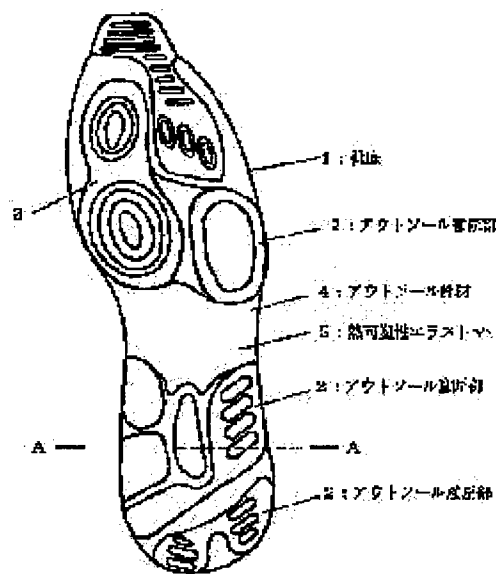
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(54) SHOE SOLE OF THREE-LAYERED STRUCTURE AND ITS PRODUCTION

(57)Abstract:

PROBLEM TO BE SOLVED: To impart suitable hardness and flexibility, cushion property and tracking property by injection molding a thermoplastic elastomer for molding a shoe sole body in an outsole part and simultaneously and integrally molding an outsole member and a shoe sole body to a three-layered structure and to improve the productivity.

SOLUTION: The shoe sole 1 of the three-layered structure is manufactured by simultaneously integrating the outsole member 4 and the shoe sole body 6 by injection molding of the thermoplastic elastomer 5 for molding the shoe sole body to the outsole member 4 composed of an outsole design part 2 of synthetic rubber and the thermoplastic elastomer sheet joined and integrated thereto. More specific examples of the synthetic rubber include X-NBR, carboxylated acrylonitrile-butadiene rubber, synthetic isoprene rubber, acrylonitrile-butadiene rubber, or the like. More specific examples of the thermoplastic elastomer include amide-based elastomers, urethane-based elastomers, styrene-based elastomers, olefin-based elastomers, or the like.



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CLAIMS

[Claim(s)]

[Claim 1] To an outsole member constituted with a thermoplastic elastomer sheet by which uniting was carried out to an outsole design section of a synthetic rubber. A sole having carried out simultaneous integral moulding of said outsole member and the sole body, and making it three layer systems by carrying out injection molding of the thermoplastic elastomer for sole body shaping.

[Claim 2] The sole according to claim 1, wherein an outsole design section and a thermoplastic elastomer sheet of a synthetic rubber are unified and said outsole member is formed in contour shape of an outsole design section.

[Claim 3] The sole according to claim 1, wherein uniting of said outsole member is carried out with a thermoplastic elastomer sheet formed in an outsole design section and sole contour shape of a synthetic rubber.

[Claim 4] The sole according to claim 1, wherein said outsole member carried out the connection unification of an outsole design section of one synthetic rubber, and the outsole design section of other synthetic rubbers with a thermoplastic elastomer sheet and is formed in sole contour shape.

[Claim 5] After arranging a member for outsole designs which carried out mold omission of the kneading sheet of a synthetic rubber unconstructed a bridge to a crevice for outsole designs of a preforming sole metallic mold and carrying out application-of-pressure heating, this member for outsole designs carries out the mold opening of the metallic mold in an initial stage of bridge construction, After installing a thermoplastic elastomer sheet which has the shape which abbreviated-agreed in contour shape of a crevice for outsole designs, An outsole member which carried out application-of-pressure heating again, and carried out integral moulding of a design section and a thermoplastic elastomer sheet of said synthetic rubber is formed, By arranging this outsole member so that it may agree after trimming in a crevice for designs of this injection molding die for bottoms in crevice shape for designs of this injection molding die for bottoms, and the mold clamp back carrying out injection molding of the thermoplastic elastomer for sole body formation, A manufacturing method of a sole with which said thermoplastic elastomer sheet and thermoplastic elastomer for sole body formation are characterized by three layer systems by which simultaneous integral moulding was carried out.

[Claim 6] After arranging a member which carried out mold omission of the kneading sheet of a synthetic rubber unconstructed a bridge to a crevice for outsole designs of a preforming sole metallic mold and carrying out application-of-pressure heating, this member for outsole designs carries out the mold opening of the metallic mold in an initial stage of bridge construction, Next, after installing a thermoplastic elastomer sheet

which has the shape which abbreviated-agreed in sole contour shape of an outsole, An outsole member which carried out application-of-pressure heating again, and carried out integral moulding of a design section and a thermoplasticity elastomer sheet of said synthetic rubber is formed, By installing this outsole member so that it may agree after trimming in sole shape in a crevice for designs of this injection molding die for bottoms, and the mold clamp back carrying out injection molding of the thermoplastic elastomer for sole body formation, A manufacturing method of a sole with which said thermoplastic elastomer sheet and thermoplastic elastomer for sole body formation are characterized by three layer systems by which simultaneous integral moulding was carried out.

[Claim 7]After arranging a member which carried out mold omission of the kneading sheet of a synthetic rubber unconstructed a bridge to two or more crevices for outsole designs of a preforming sole metallic mold and carrying out application-of-pressure heating, this member for outsole designs carries out the mold opening of the metallic mold in an initial stage of bridge construction, Next, after installing a thermoplastic elastomer sheet which has the shape which abbreviated-agreed in sole contour shape of an outsole, An outsole member which carried out application-of-pressure heating again, and carried out the connection unification of a design section of two or more of said synthetic rubbers and the design section of a synthetic rubber with a thermoplastic elastomer sheet is formed, By installing this outsole member so that it may agree after trimming in sole shape in a crevice for designs of this injection molding die for bottoms, and the mold clamp back carrying out injection molding of the thermoplastic elastomer for sole body formation, A manufacturing method of a sole with which said thermoplastic elastomer sheet and thermoplastic elastomer for sole body formation are characterized by three layer systems by which simultaneous integral moulding was carried out.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]In this invention, after carrying out simultaneous integral moulding of the design section and the thermoplastic elastomer sheet made of a synthetic rubber, injection molding of the sole body member of thermoplastic elastomer is carried out.

Therefore, it is related with the sole and manufacturing method of three layer systems which carried out simultaneous integral moulding to said thermoplastic elastomer sheet.

[0002]

[Description of the Prior Art]Before, as a raw material for shaping of a sole, various kinds of things are publicly known. For example, in what is indicated by JP,8-294933,A as a patent of point **. After halogenating the surface of rubber, the invention of the manufacturing method of the sole of the sports shoes which carry out multi-color molding of the thermoplastics, such as a polyurethane elastomer and a polyamide elastomer, to the surface of this halogenated rubber by compression molding or injection molding is publicly known.

[0003]The diversified product which the thermoplastic plastic material pasted up on the thermoplastic elastomer (TPV) produced by carrying out dynamically vulcanization of the rubber distributed in the state of the particle in the thermoplastic matrix to

JP,7-195622,A, That is, the invention about the article which consists of thermoplastics and TPV is indicated. Make the shoes by insert molding or 2 color injection molding into an example, and fatigue resistance is high, A modification hysteresis is low and the thing about shaping of the sole of the insert molding which ejected the TPV alloy (thermoplastics / rubber alloy) on the sole excellent in the low-temperature characteristic made from polyether ester amide (sole) is indicated.

[0004]In the Patent Publication Heisei No. 505333 [eight to] gazette, polyether amide, polyether ester, The sole which consists of a two-layer article of the constituent containing the thermoplastic elastomer which is pasted up on a dense material which comprises the thermoplastics which is chosen from the groups which consist of polyurethane, and by which a weight saving is not carried out, and by which the weight saving was carried out is indicated, and it is publicly known.

[0005]The composite structure produced by combining the vulcanized elastomer containing a carboxylic acid group in the Patent Publication Heisei No. 511741 [eight to] gazette thermoplastic polymer including a block and directly, Manufacturing the sole of sports shoes with the manufacturing method which vulcanizes an elastomer on that spot on thermoplastic polymer is indicated. In addition, it is similar to what is indicated by JP,8-294933,A, and after pretreating a primer, halogenation, etc. on the surface of the rubber which carried out vulcanization molding, it inserts to an injection molding mold and the sole of the sports shoes which carried out injection molding of the raw material of a sole body is also already produced commercially.

[0006]

[Problem(s) to be Solved by the Invention]In the method currently indicated by said JP,8-294933,A or the manufacturing method of the similar sole and a sole, In [a routing counter becomes the secondary surface activity-ized processing called pretreatment of a primer or halogenation is required for the surface of the rubber which carried out vulcanization molding, and complicated, and] these manufacturing methods, When injection molding of the thermoplastics, such as a polyurethane elastomer and a polyamide elastomer, was carried out, vulcanized gum changed easily with injection pressure, and thermoplastics caused a surroundings lump appearance defect at the design surface part of Rubber Division. Therefore, since rubber hardness needed to be set as the range of 75-85A by Shore, hardness needed to be made high, in order to prevent these defects, and thickness of Rubber Division needed to be thickened and it needed to be made to correspond to injection pressure, as a sole raw material, rigidity became highly and hard too much, and only the unsuitable sole has been provided.

[0007]Like the Patent Publication Heisei No. 505333 [eight to] gazette, polyether amide, polyether ester, In the sole which consists of a two-layer article of the constituent containing the thermoplastic elastomer which is pasted up on a dense material which comprises the thermoplastics which is chosen from the groups which consist of polyurethane, and by which a weight saving is not carried out, and by which the weight saving was carried out, Since the endurance of the thermoplastic elastomer itself by which the weight saving was carried out was low, it had a possibility that the durable performance of the sole of a product itself fell.

[0008]The composite structure produced by combining the vulcanized elastomer containing a carboxylic acid group in the Patent Publication Heisei No. 511741 [eight to] gazette thermoplastic polymer including a block and directly, In what manufactures the sole of sports shoes with the manufacturing method which vulcanizes an elastomer on that spot on thermoplastic polymer. Although there was no statement detailed about the manufacturing method of a sole concretely, when press forming was adopted, for example, the barricade (tunic) of rubber was formed on thermoplastic polymer, and, the

way things stand, it had a problem of being unable to produce commercially from an exterior, either.

[0009]In addition, in the manufacturing method of the conventional sole of these above-mentioned. By every method, to a thermoplastic elastomer sheet. Since the molding temperature more than heat deflection temperature is applied, in order for heat modification and the modification at the time of cooling to remain after unmolding and to prevent these, Since a cooling system was needed for this injection molding die for bottoms, very expensive and complicated equipment needed to be installed and it had the problem referred to as becoming comparatively high-priced also from a point of the manufacturing cost. Therefore, it has hardness and flexibility with it, cushioning properties, and tracking nature, and a manufacturing method of a sole with a cheap manufacturing cost with good productivity or a sole was desired. [good endurance and] [moderate as a raw material of a sole]

[0010]

[Means for Solving the Problem]In order to attain said purpose, this invention finds out a manufacturing method of a sole and a sole which consists of the following composition. That is, a sole of three layer systems and a manufacturing method for the same are provided by preforming first a synthetic rubber and a thermoplastic elastomer sheet unconstructed a bridge, and carrying out injection molding of the thermoplastic elastomer which forms a sole body on the post heating plasticity elastomer.

[0011]

[Embodiment of the Invention]An embodiment of the invention is explained in full detail below. To namely, the outsole member constituted with the thermoplastic elastomer sheet by which uniting was carried out to the outsole design section of the synthetic rubber as for this invention of claim 1. It is a sole having carried out simultaneous integral moulding of said outsole member and the sole body, and making it three layer systems by carrying out injection molding of the thermoplastic elastomer for sole body shaping. Although projection shape which consists of the usual irregular pattern etc., such as a design section, KURITSU, and a stud, is also included as an outsole design section of a synthetic rubber in this invention, In detailed explanation of the following specifications, the outsole which has an irregular pattern as an outsole design section is explained.

[0012]Next, in the outsole member of this invention of claim 2, The outsole design section and the thermoplastic elastomer sheet of a synthetic rubber are unified, and it is formed in the contour shape of a design section, And it is a sole having carried out simultaneous integral moulding of said outsole member and the sole body, and making it three layer systems by carrying out injection molding of the thermoplastic elastomer for sole body shaping.

[0013]In the outsole member of this invention of claim 3, Uniting of the outsole design section of a synthetic rubber and the thermoplastic elastomer sheet formed in sole contour shape is carried out, And it is a sole having carried out simultaneous integral moulding of said outsole member and the sole body, and making it three layer systems by carrying out injection molding of the thermoplastic elastomer for sole body shaping.

[0014]In the outsole member of this invention of claim 4, Carry out the connection unification of the outsole design section of one synthetic rubber, and the outsole design section of other synthetic rubbers with a thermoplastic elastomer sheet, and it is formed in sole contour shape, And it is a sole having carried out simultaneous integral moulding of said outsole member and the sole body, and making it three layer systems by carrying out injection molding of the thermoplastic elastomer for sole body shaping.

[0015]In the manufacturing method of the sole of this invention of claim 5, After

arranging the member which carried out mold omission of the kneading sheet of the synthetic rubber unconstructed a bridge to the crevice for outsole designs of a preforming sole metallic mold and carrying out application-of-pressure heating, this member for outsole designs carries out the mold opening of the metallic mold in the initial stage of bridge construction, Next, after installing the thermoplastic elastomer sheet which has the shape which abbreviated-agreed in the contour shape of the crevice for outsole designs, The outsole member which carried out application-of-pressure heating again, and carried out integral moulding of the design section and the thermoplastic elastomer sheet of said synthetic rubber is formed, By arranging this outsole member so that it may agree after trimming in the crevice for designs of this injection molding die for bottoms in the crevice shape for designs of this injection molding die for bottoms, and the mold clamp back carrying out injection molding of the thermoplastic elastomer for sole body formation, Said thermoplastic elastomer sheet and the thermoplastic elastomer for sole body formation are the manufacturing methods of the sole characterized by three layer systems by which simultaneous integral moulding was carried out.

[0016]In the manufacturing method of the sole of this invention of claim 6, After arranging the member which carried out mold omission of the kneading sheet of the synthetic rubber unconstructed a bridge to the crevice for outsole designs of a preforming sole metallic mold and carrying out application-of-pressure heating, this member for outsole designs carries out the mold opening of the metallic mold in the initial stage of bridge construction, Next, after installing the thermoplastic elastomer sheet which has the shape which abbreviated-agreed in the sole contour shape of the outsole, The outsole member which carried out application-of-pressure heating again, and carried out integral moulding of the design section and the thermoplastic elastomer sheet of said synthetic rubber is formed, By installing this outsole member so that it may agree after trimming in sole shape in the crevice for designs of this injection molding die for bottoms, and the mold clamp back carrying out injection molding of the thermoplastic elastomer for sole body formation, Said thermoplastic elastomer sheet and the thermoplastic elastomer for sole body formation are the manufacturing methods of the sole characterized by three layer systems by which simultaneous integral moulding was carried out.

[0017]In the manufacturing method of the sole of this invention of claim 7, After arranging the member which carried out mold omission of the kneading sheet of the synthetic rubber unconstructed a bridge to two or more crevices for outsole designs of a preforming sole metallic mold and carrying out application-of-pressure heating, this member for outsole designs carries out the mold opening of the metallic mold in the initial stage of bridge construction, Next, after installing the thermoplastic elastomer sheet which has the shape which abbreviated-agreed in the sole contour shape of the outsole, The outsole member which carried out application-of-pressure heating again, and carried out the connection unification of the design section of two or more of said synthetic rubbers and the design section of a synthetic rubber with the thermoplastic elastomer sheet is formed, By installing this outsole member so that it may agree after trimming in sole shape in the crevice for designs of this injection molding die for bottoms, and the mold clamp back carrying out injection molding of the thermoplastic elastomer for sole body formation, Said thermoplastic elastomer sheet and the thermoplastic elastomer for sole body formation are the manufacturing methods of the sole characterized by three layer systems by which simultaneous integral moulding was carried out.

[0018]As a synthetic rubber in this invention, X-NBR:carboxylation acrylic nitril

butadiene rubber, IR: Synthetic polyisoprene rubber, NBR:acrylic nitril butadiene rubber, BR:butadiene rubber, an SBR:styrene butadiene rubber, NR : crude rubber etc. can be used. As thermoplastic elastomer, a TPAE:amide system elastomer, TPU: A urethane system elastomer, SBC : A styrene system elastomer, TPO: An olefin system elastomer, TPEE : An ester system elastomer, TPVC: A VCM/PVC system elastomer, RB:polybutadiene, IR: Isoprene, a fluorinated elastomer, chlorinated polyethylene, EVA, ion cross-linked polyethylene, etc. can be used alone respectively.

[0019]Use the above-mentioned thermoplastic elastomer as matrix resin, and Carbon fiber, It can also be used with the gestalt of fiber reinforced thermoplastic (FRTP) using the reinforcing fiber of the milled fiber which consists of glass fiber, an aramid fiber, high strength polyester fiber, etc., or a staple fiber like a chopped strand.

[0020]The above-mentioned thermoplastic elastomer is preferably used as matrix resin, It can also be used as fiber reinforced thermoplastic (FRTP) which is a gestalt of the stumpable sheet impregnated with the textiles which consist of reinforcing fibers, such as carbon fiber, glass fiber, an aramid fiber, and high strength polyester fiber, or a nonwoven fabric. Thus, the rigidity of a sole and firmness improve by using the gestalt of FRTP or a stumpable sheet, and. Since the difference of contraction can be pressed down rather than the sheet which comprised contraction and the thermoplastic-elastomer independent of the synthetic rubber by using these reinforcing fibers, a design section can be prevented from changing, and also the flexibility of a design of a sole spreads more and needs can be satisfied broadly.

[0021]

[Example]Next, if the example of this invention is described, as shown in drawing 1 thru/or drawing 2, To the outsole member 4 constituted with the thermoplastic elastomer sheet 3 by which uniting was carried out to the outsole design section 2 of the synthetic rubber. It is the sole 1 having carried out simultaneous integral moulding of said outsole member 4 and the sole body 6, and making it three layer systems by carrying out injection molding of the thermoplastic elastomer 5 for sole body shaping.

[0022]Next, if the other examples of this invention are described, as shown in drawing 1 thru/or drawing 2, In the outsole member 4, the outsole design section 2 and the thermoplastic elastomer sheet 3 of a synthetic rubber are unified, and it is formed in the contour shape of the outsole design section 2, And it is the sole 1 having carried out simultaneous integral moulding of said outsole member 4 and the sole body 6, and making it three layer systems by carrying out injection molding of the thermoplastic elastomer 5 for sole body shaping.

[0023]When describing the other examples of this invention, as shown in drawing 3 thru/or drawing 4, in the outsole member 4, uniting of the outsole design section 2 of a synthetic rubber and the thermoplastic elastomer sheet 3 formed in sole contour shape is carried out, and did not carry out the graphic display, but. It is a sole having carried out simultaneous integral moulding of said outsole member 4 and the sole body, and making it three layer systems by carrying out injection molding of the thermoplastic elastomer for sole body shaping.

[0024]In [if the other examples of this invention are described, as it is shown in drawing 3 thru/or drawing 4] the outsole member 4, Although the connection unification of the outsole design section 2 of one synthetic rubber and the outsole design section 2 of other synthetic rubbers is carried out with the thermoplastic elastomer sheet 3, and it is formed in sole contour shape and the graphic display was not carried out, It is a sole having carried out simultaneous integral moulding of said outsole member 4 and the sole body, and making it three layer systems by carrying out injection molding of the thermoplastic elastomer for sole body shaping.

[0025]After arranging the member 2A for outsole designs as for which a kneaded part of the synthetic rubber unconstructed a bridge took out and which carried out mold omission of the sheet to the crevice 8 for outsole designs of the preforming sole metallic mold 7 and carrying out application-of-pressure heating (150-160 **), as first shown in drawing 5 if the manufacturing method of the sole 1 of this invention is explained, This member 2A for outsole designs is before a bridge construction start (although it changes with combination of a synthetic rubber). usually, after an application-of-pressure heating start -- less than 1 to 2 minutes -- it is desirable -- the mold opening of the metallic mold being carried out, and, Next, after installing the thermoplastic elastomer sheet 3 which has the shape which abbreviated-agreed in the contour shape of the crevice 8 for outsole designs, After carrying out the melting unification of the thermoplastic elastomer sheet 3 and forming the outsole member 4 at the same time it carries out application-of-pressure heating again with heat pressing and constructs a bridge in the outsole design section 2 of the synthetic rubber for which a bridge is not constructed [said], After cooling a metallic mold at about 120 ** or less, the outsole member 4 is unmolded, Next, by arranging this outsole member 4 so that it may agree after trimming in the crevice 10 for designs of this injection molding die 9 for bottoms in the crevice shape for designs of this injection molding die 9 for bottoms, and the mold clamp back carrying out injection molding of the thermoplastic elastomer 5 for sole body formation, as shown in drawing 6, The thermoplastic elastomer sheet 3 and the sole body 6 of said outsole member 4 are a manufacturing method of the sole 1 characterized by three layer systems by which simultaneous integral moulding was carried out.

[0026]The manufacturing method of the sole 1 of three layer systems concerning this invention is explained based on the cura strike bridge construction curve shown in drawing 7. First, the member 2A for outsole designs as for which a kneaded part of the synthetic rubber unconstructed a bridge took out and which carried out mold omission of the sheet is arranged to the crevice 8 for outsole designs of the preforming sole metallic mold 7, and application-of-pressure heating (150-160 **) is performed. Next, the member 2A for outsole designs performs a mold opening for a metallic mold in the initial stage of bridge construction. That is, it is a part applicable to the segment of time of A of the cura strike bridge construction curve of drawing 7, a mold opening is once performed, although the segment of time of this A changes with combination of a synthetic rubber, its less than 1 to 3 minutes are usually desirable after an application-of-pressure heating start, and it is about about 2 to 3 minutes in vulcanization with sulfur.

In bridge construction by a peroxide, about about 1 to 2 minutes becomes with a rule of thumb.

[0027]Next, after putting the thermoplastic elastomer sheet 3 which has the shape which abbreviated-agreed between the contour shape of the crevice 8 for outsole designs, The melt adhesion unification of the thermoplastic elastomer sheet 3 is carried out, and the outsole member 4 is formed at the same time it carries out application-of-pressure heating again with heat pressing and constructs a bridge in the outsole design section 2 of the synthetic rubber for which a bridge is not constructed [said]. That is, a heating process is finished when reaching the flat bridge construction temperature of the segment of time of B of the cura strike bridge construction curve of drawing 7. Next, after cooling a preforming sole metallic mold at about 120 ** or less, the outsole member 4 is unmolded. That is, cooking temperature is in the state which the polyamide elastomer fused in 150-160 **, and further, since the molding shrinkage differs

(polyamide elastomer: 8/1000, synthetic rubber:23/1000), it is necessary to cool by the polyamide elastomer and a synthetic rubber.

[0028]Next, the outsole member 4 is made into the crevice shape for designs and identical shape of this injection molding die 9 for bottoms, or the periphery of 0.1-5 mm (preferably about 0.1-0.3 mm) is arranged so that it may agree after trimming greatly in the crevice 10 for designs of this injection molding die 9 for bottoms, and eye a mold clamp is performed. By namely, operation of the presser-foot pin to the design section at the time of the shape of the periphery of this outsole member 4 carrying out injection molding of the thermoplastic elastomer 5 for sole body formation by arranging this outsole member 4 in the back. It is thought that shortening of a process can be measured also from on a process of operation without it also leaking that the resin produced and ejected turns around the work like rubber packing, and a barricade arising.

[0029]Carry out the melting unification of the thermoplastic elastomer sheet 3, and form the outsole member 4 at the same time it carries out application-of-pressure heating with said heat pressing and constructs a bridge in the outsole design section 2 of the synthetic rubber for which a bridge is not constructed [said], but. As conditions in this case, although based also on each raw material, generally the cycle time for 1 to 3 minutes is required in a temperature requirement (the bridge construction temperature of a synthetic rubber, and the melting temperature of a thermoplastic elastomer sheet to about 150 ** - 180 **). Thereby, a bridge is constructed over the outsole design section 2 of a synthetic rubber, and it elongates the thermoplastic elastomer sheet 3 with heating. And since bridge construction adhesion will be carried out to the thermoplastic elastomer sheet 3 by the outsole design section 2 of a synthetic rubber, and the barricade (tunic) produced from it, [0030]In the manufacturing method of the other examples of the sole of this invention, After arranging the member 2A which carried out mold omission of the kneading sheet of the synthetic rubber unconstructed a bridge to the crevice 8 for outsole designs of the preforming sole metallic mold 7 and carrying out application-of-pressure heating, this member 2A for outsole designs carries out the mold opening of the metallic mold in the initial stage of bridge construction, Next, after installing the thermoplastic elastomer sheet 3 which has the shape which abbreviated-agreed in the sole contour shape of the outsole, The outsole member 4 which carried out application-of-pressure heating again, and carried out integral moulding of the outsole design section 2 and the thermoplastic elastomer sheet 3 of said synthetic rubber is formed, By installing this outsole member 4 so that it may agree after trimming in sole shape in the crevice 10 for designs of this injection molding die 9 for bottoms, and the mold clamp back carrying out injection molding of the thermoplastic elastomer 5 for sole body formation, Said thermoplastic elastomer sheet 3 and the sole body 6 are the manufacturing methods of the sole 1 characterized by three layer systems by which simultaneous integral moulding was carried out.

[0031]In the manufacturing method of the other examples of the sole of this invention, After arranging the member 2A which carried out mold omission of the kneading sheet of the synthetic rubber unconstructed a bridge to two or more crevices 8 for outsole designs of the preforming sole metallic mold 7 and carrying out application-of-pressure heating, this member 2A for outsole designs carries out the mold opening of the metallic mold in the initial stage of bridge construction, Next, after installing the thermoplastic elastomer sheet 3 which has the shape which abbreviated-agreed in the sole contour shape of the outsole, The outsole member 4 which carried out application-of-pressure heating again, and carried out the connection unification of the design section 2 of two or more of said synthetic rubbers and the design section 2 of a synthetic rubber with the thermoplastic elastomer sheet 3 is formed, By installing this outsole member 4 so that it

may agree after trimming in sole shape in the crevice 10 for designs of this injection molding die 9 for bottoms, and the mold clamp back carrying out injection molding of the thermoplastic elastomer 5 for sole body formation, Said thermoplastic elastomer sheet 3 and the thermoplastic elastomer of the sole body 6 are the manufacturing methods of the sole 1 characterized by three layer systems by which simultaneous integral moulding was carried out.

[0032]As thickness of the outsole design section 2 of the synthetic rubber concerning this invention, it is preferred to set it as about 1 mm - about 5 mm. On the other hand, in the composition of this invention, the about 0.5-0.75-mm thing of thickness is effective, although 35-65 are desirable as thickness of the thermoplastic elastomer sheet 3 at about 0.1 mm - about 1.0 mm as for the Shore D hardness in consideration of adhesive strength. The resin which carries out injection molding may be said amide system elastomer sheet, and as long as it can weld it, it may be a urethane system elastomer and a styrene system elastomer. For example, it is (trade name of Atochem Japan as the above-mentioned amide system elastomer :P If EBAX5533) is used, It is (trade name of Atochem Japan to the resin which carries out injection molding :P If EBAX6333) is used, welding will become possible, and it is (trade name of Atochem Japan :P Rather than EBAX5533), a base part with high tensile strength and elastic modulus can be formed. The sole of sports shoes suitable for various eyes is producible by selecting these raw materials.

[0033]The example of the rubber compounding of this invention is shown in Table 1, Table 2, and Table 3.

[0034]

[Table 1]

配合表 — 1

配合剤	配合名	イオウ架橋配合						
		①	②	③	④	⑤	⑥	⑦
X-NBR		100	75	50	25	75	50	25
SBR		—	—	—	—	25	50	75
NBR		—	25	50	75	—	—	—
ステアリン酸		1	1	1	1	1	1	1
シリカ	*-1	40	40	40	40	40	40	40
可塑剤	*-2	10	10	10	10	10	10	10
PEG#4000		2	2	2	2	2	2	2
加硫活性化剤	*-3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
老化防止剤	*-4	1	1	1	1	1	1	1
粘着付与剤	*-5	5	5	5	5	5	5	5
酸化チタン		5	5	5	5	5	5	5
群青		0.05	0.05	0.05	0.05	0.05	0.05	0.05
スコーチ防止剤	*-6	0.3	0.3	0.3	0.3	0.3	0.3	0.3
酸化亜鉛		3	3	3	3	3	3	3
粉末イオウ		1.7	1.7	1.7	1.7	1.7	1.7	1.7
促進剤	CBS (CZ)	2.0	2.0	2.0	2.0	2.0	2.0	2.0
"	DOTG (DT)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
"	TMTM (TS)	0.3	0.3	0.3	0.3	0.3	0.3	0.3
架橋剤	DGP-40	—	—	—	—	—	—	—
合	計	171.95	171.95	171.95	171.95	171.95	171.95	171.95

点線より下の配合剤はロール機にて添加

イオウ架橋条件 (5mmシート)

架橋温度 : 160℃

架橋時間 : 約17分

[0035]

[Table 2]

配合表 — 2

配合剤	配合名	過酸化剤架橋配合						
		①	②	③	④	⑤	⑥	⑦
X-NBR		100	75	50	25	75	50	25
SBR		—	—	—	—	25	50	75
NBR		—	25	50	75	—	—	—
ステアリン酸		1	1	1	1	1	1	1
シリカ	*-1	40	40	40	40	40	40	40
可塑剤	*-2	10	10	10	10	10	10	10
PEG#4000		2	2	2	2	2	2	2
加硫活性剤	*-3	—	—	—	—	—	—	—
老化防止剤	*-4	1	1	1	1	1	1	1
粘着付与剤	*-5	5	5	5	5	5	5	5
酸化チタン		5	5	5	5	5	5	5
群青		0.05	0.05	0.05	0.05	0.05	0.05	0.05
スコーチ防止剤	*-6	—	—	—	—	—	—	—
酸化亜鉛		—	—	—	—	—	—	—
粉末イオウ		—	—	—	—	—	—	—
促進剤 CBS (CZ)		—	—	—	—	—	—	—
" DOTG (DT)		—	—	—	—	—	—	—
" TMTM (TS)		—	—	—	—	—	—	—
架橋剤 DCP-40		5.0	5.0	5.0	5.0	5.0	5.0	5.0
合 計		169.55	169.55	169.50	169.50	169.50	169.50	169.50

点線より下の配合剤はロール機にて添加

過酸化剤架橋条件 (5mmシート)

架橋温度 : 160℃

架橋時間約 : 15分

[0036]

[Table 3]

配合表 — 3

配合剤	配合名	過酸化剤架橋配合						
		①	②	③	④	⑤	⑥	⑦
X-NBR		100	75	50	25	75	50	25
SBR		—	—	—	—	25	50	75
NBR		—	25	50	75	—	—	—
ステアリン酸		1	1	1	1	1	1	1
シリカ	*-1	45	45	45	45	45	45	45
可塑剤	*-2	15	15	15	15	15	15	15
PEG#4000		2	2	2	2	2	2	2
老化防止剤	*-4	1	1	1	1	1	1	1
粘着付与剤	*-5	5	5	5	5	5	5	5
酸化チタン		10	10	10	10	10	10	10
群青		0.05	0.05	0.05	0.05	0.05	0.05	0.05
TAIC	*-7	2.0	2.0	2.0	2.0	2.0	2.0	2.0
架橋剤 DCP-40		4.0	4.0	4.0	4.0	4.0	4.0	4.0
合 計		185.05	185.05	185.05	185.05	185.05	185.05	185.05

架橋剤はロール機にて添加

過酸化剤架橋条件 (5mmシート)

架橋温度 : 160℃

架橋時間 : 約17分

[0037]

[Effect of the Invention] In a sole concerning this invention, and a manufacturing method for the same, Since bridge construction adhesion of the design section and the

thermoplastic elastomer sheet of a synthetic rubber is carried out, In order to install so that the hardness of a sole may have about 35-65 and rigidity by D hardness and may agree in the crevice for designs of this injection molding die for bottoms, rubber hardness is set to 60-75 by the Shore A hardness, and becomes what was suitable as a sole raw material.

[0038] Since the outsole member which enlarged the thermoplastic elastomer sheet 0.1-5 mm to the periphery of the design section of a synthetic rubber is installed so that it may agree in the crevice for designs of this injection molding die for bottoms, When injection molding of the thermoplastic elastomer for sole body formation is carried out, the effect that the surroundings lump to the design section of a synthetic rubber can be prevented is done so.

[0039] In addition, since the manufacture maker and injection-molding maker of rubber are usually separate in the manufacturing method of the conventional sole in many cases, productive efficiency falls in the combination of such a raw material, but. In this invention, the process of an outsole member of carrying out bridge construction adhesion of the design section and the thermoplastic elastomer sheet of a synthetic rubber is mass-produced by the manufacture maker of rubber in consideration of productive efficiency, Since this outsole member can be inserted to this injection molding die for bottoms by an injection-molding maker and a sole body can be manufactured, productive efficiency is improved. As mentioned above, in a sole of this invention, and a manufacturing method for the same, since injection molding of the sole body can be carried out and it can fabricate in various shape, the flexibility on a design improves.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The top view showing the sole which has three layer systems concerning this invention.

[Drawing 2] The sectional view showing the section of the A-A part of drawing 1 of the sole which has three layer systems concerning this invention.

[Drawing 3] The top view showing the outsole member of the sole concerning this invention.

[Drawing 4] The sectional view showing the section of the B-B part of drawing 3 which is an outsole member of the sole concerning this invention, a C-C part, a D-D part, and an E-E part.

[Drawing 5] The sectional view showing one process of the manufacturing method of the sole concerning this invention.

[Drawing 6] The sectional view showing one process of the manufacturing method of the sole concerning this invention.

[Drawing 7] The explanatory view showing the cura strike bridge construction curve concerning this invention.

[Description of Notations]

1 Sole

2 Outsole design section

2A The member for outsole designs

3 A thermoplastic elastomer sheet

4 Outsole member

5 Thermoplastic elastomer

6 Sole body

- 7 Preforming sole metallic mold
 - 8 The crevice for outsole designs
 - 9 This injection molding die for bottoms
 - 10 The crevice for designs
 - 11 Gate
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